

What is claimed is:

1. A method for finding a threshold value in image segmentation, the method comprising the steps of:

- 5       a) gaining histogram distribution of an image;  
       b) computing entropy values corresponding to gray levels in the histogram; and  
       c) gaining a minimum entropy value corresponding to the gray level as the threshold value by using a fixed point  
10       iteration FPI based on the computed entropy values.

2. The method as recited in claim 1, wherein the step c) includes the steps of:

- c-1) obtaining a plurality of possible optimal  
15       thresholds;  
       c-2) obtaining entropy values of gray levels corresponding to the obtained possible optimal thresholds; and  
       c-3) obtaining the threshold value by comparing entropy values and selecting minimum entropy value.

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3. The method as recited in claim 2, wherein each of the possible optimal thresholds is obtained by obtaining a value of possible maximum gray level having maximum entropy value, a value of possible minimum gray level having minimum  
25       entropy value and obtaining possible optimal threshold by adding two values of the possible maximum gray level and the possible minimum gray level and dividing the sum of addition

by half.

4. The method as recited in claim 3, wherein the possible optimal thresholds are obtained by changing one of the value of the possible maximum gray level and the value of the possible minimum gray level according to comparison of entropy values of the possible maximum gray level, the possible minimum gray level and obtained optimal threshold and by newly obtaining a possible optimal threshold based on the changed values of the possible maximum gray level and the value of the possible minimum gray level.

5. The method as recited in claim 2. wherein the step c-1) includes the steps of:

15 c-i) obtaining an initial possible optimal threshold, an initial possible maximum gray level having maximum entropy value and an initial possible minimum gray level having minimum entropy value by setting  $G_{min}$  to have the initial possible minimum gray level, setting  $G_{max}$  to have the initial possible maximum gray level, setting  $g_{min}$  and  $g_{max}$  to have identical values  $G_{min}$  and  $G_{max}$ , respectively for not influencing change of value of  $G_{min}$  and  $G_{max}$ , setting  $P_i$  to have the initial possible optima threshold by computing equation  $P_i = ((g_{min} + g_{max})/2)$  and setting  $g_{cal}$  to have the identical value of  $P_i$ ;

25 c-ii) obtaining entropy values  $E(g_{min})$ ,  $E(g_{max})$  and  $E(g_{cal})$  of  $g_{min}$ ,  $g_{max}$ , and  $g_{cal}$ ;

c-iii) comparing  $E(g_{min})$  and  $E(g_{cal})$ ;

c-iv) if  $E(g_{\min})$  is higher than  $E(g_{\text{cal}})$  as a result of comparison of step c-iii), changing the value of  $g_{\min}$  to have the value of  $g_{\text{cal}}$  and not changing the value of  $g_{\max}$  by setting a value of  $g_{\text{temp}}$  to have the value of  $g_{\min}$  and setting a value  
5 of  $g_{\text{fix}}$  to have the value of  $G_{\max}$ ;

c-v) if  $E(g_{\min})$  is equal or less than  $E(g_{\text{cal}})$  as a result of comparison of step c-iii), changing the value of  $g_{\max}$  to have the value of  $g_{\text{cal}}$  and not changing the value of  $g_{\min}$  by setting a value of  $g_{\text{temp}}$  to have the value of  $g_{\max}$  and setting a  
10 value of  $g_{\text{fix}}$  to have the value of  $G_{\min}$ ;

c-vi) obtaining new possible optimal threshold  $p_i$  based on changed value of  $g_{\min}$  and  $g_{\max}$  by an equation as:  $P_i = (g_{\text{fix}} + g_{\text{temp}})/2$ ;

c-vii) obtaining  $p_{i+1}$  by using a linear equation  $f$  with  
15  $(g_{\text{temp}}, 0)$ , wherein the  $f$  is  $f(g) = ag + b$ ,  $a = g_{\text{temp}}$  and  $b$  is 0 and by equation as  $p_{i+1} = f^{-1}(E(p_i))$ ;

c-viii) comparing  $p_{i+1}$  with previously obtained  $p_i$ s;

c-ix) if there are not identical two  $P_i$ s, determining next possible optimal threshold by setting  $g_{\text{temp}}$  to have the  
20 value of  $p_{i+1}$  and setting  $g_{\text{cal}}$  to have a value of  $(g_{\text{temp}} + g_{\text{fix}})/2$ , and reputedly performing steps c-ii) to c-viii); and

c-x) if there are identical any two  $P_i$ s, selects the threshold value by comparing entropy values of corresponding  $P_i$ s and selecting  $P_i$  having minimum entropy value as the  
25 threshold value.